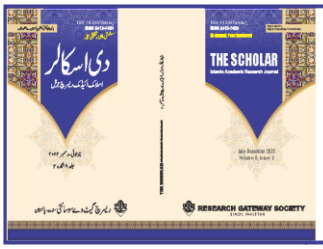

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CONTRIBUTIONS OF MUSLIMS AND ISLAM IN THE DEVELOPMENT OF MEDICAL SCIENCE

1. Naimatullah Soomro
Associate Professor of English Govt. Syed Noor Muhammad Shah Degree College Tharushah, Sindh
Email: naimatsoomro296@gmail.com
ORCID ID:
https://orcid.org/0000-0003-3567-8543

2. Hafiz Sibghatullah Bhutto
Assistant professor, Department of Comparative religion and Islamic Culture, University of Sindh, Jamshoro, Sindh
Email: sibghat_bhutto@usindh.edu.pk
ORCID ID:
https://orcid.org/0000-0002-2255-7833

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CONTRIBUTIONS OF MUSLIMS AND ISLAM IN THE DEVELOPMENT OF MEDICAL SCIENCE

Naimatullah Soomro, Hafiz Sibghatullah Bhutto

ABSTRACT:

Muslims have played very important role in the field of medical science. They began experiments and observations from the first century of Hijra. Islam created great enthusiasm for scientific activities. After extensive translation from Greek, Sanskrit and some other ancient languages into Arabic, Islamic physicians had at their disposal nearly all the valuable medical works, like Hippocratic and Galenic writings. Islamic physicians were immensely influenced by them, and largely depended on their studies as they considered them medical authorities. One of the important physicians in Islam was Avicenna (980-1037) the king of medicine. He had a great influence in the West and the East and was regarded as a medical authority until the era of medical studies. It was used as textbook in the West and East. Another Muslim physician in Islam who had great influence on later Ottoman physicians was Ibn al Nafis. In the 14th century Mansoor bin Muhammad composed a monograph on anatomy called" Illustrated Anatomy " By the eighth century, most of Europe was deep in the dark ages, with only the Byzantine Empire preserving a few fragments of the ancient knowledge. Islamic Caliphate provided a stable environment for Islamic Scholars, who were sponsored by the ruling class. Most Islamic scholars were free to undertake pure research. As with the Ancient Greeks, the Islamic observations on life were closely tied to philosophy and theology. There are so many Muslim scholars who contributed a lot in the field of medical Science and will be discussed in my research paper.

KEYWORDS: Contribution, Anatomy, Human body, Pharmocology, Theology, Philosophy

Introduction

Al-Quran, the last Holy book consisting of the final word of **Allah** for the spiritual guidance of man also contains some principle facts for the pursuit of knowledge including biology. The Quran has drawn our attention to look into the mysteries of His creation and has advised us to investigate them to the best of our abilities. As far as the relationship of plant and animal life with human welfare is concerned, it is too obvious to mention. Holy Quran says in plain words that:

> "Who has made the earth your couch and the heavens your canopy; and sent down rain from the heavens; and brought forth therewith fruits for your sustenance. (Sura Al-Baqra, Ayah 22)

Then again, the Holy Quran says that:

> "There is not on animal (that lives on the earth, nor a being that flies on its wings, but (forms part of) communities like you."
>
> (Sura Al-Anaam, Ayah 38)

The English translations of the two Quranic verses, (by Abdullah Yusuf Ali 1934) reproduced here refer to important biological and medical phenomena. In these and a number of other Quranic verses referring to biological and other scientific

facts, Quran emphasizes upon us to study them carefully.

> "Say: Behold that is in the heavens and on earth."
>
> (Sura-Yunus, Ayah 101)

And again the Holy Quran says that:

> "Behold: In the creations of the heavens and the earth and the alternation of the night and day, there are indeed signs for men of understanding. And contemplate the (Wonders of) creation in the heavens and the earth*." (*Sura Aal-e-Imran, Ayah 190-191)[1]

From beginning of the eighth century, Islam created great enthusiasm for scientific activity. After extensive translation from Greek, Sanskrit and some other ancient languages into Arabic, Islamic physicians had at their disposal nearly all the valuable medical works, like Hippocratic and Galenic writings, Islamic physicians were immensely influenced by the, and largely depended on their studies as they considered them medical authorities.

Hunayn B. Ishaq was an earlier scientist who became famous in the Islamic world. He was the translator of Hippocratic and Galenic works. As a physician, he made a synthesis, using the works of Hippocrates and Galen and helped

[1] Yousif Abdullah Ali, The Noble Quran, (Islamabad, Da'wah Acadmy, 2004) 2:22

to define medical terms.

In the tenth century, Ali b. Abbas studied the anatomy of the body and was interested in the vessels and their structures. He realized that the veins had thicker coats than the arteries, because the arteries were pulsative, but the veins were not.[2]

One of the most appealing healers from a modern vantage point was the Persian Razi, called Rhazes in the West (abu-Bakr Muhammad ibn-Zakariya al-Razi, 850-c. 923). He was outstanding in his generosity and always willing to treat and help the poor. Students and practitioners througed to his lectures, and *apparently,* he was also a brilliant bedside teacher. A man of his time, he revered learning *and based* his knowledge on the books of authorities But he was also an independent thinker, not afraid to rely on his own observations when they contradicted the past; he counseled others that "all that is written in books is worth much less than the experience of a wise doctor."[3] (3)

Rhazes became blind in his last years (some say as the

[2] Abdul Hammeed, Hakeem, **Avicenna's Tract on Cardiac Drugs and Essays on Arab Cardiotheraphy** (Delhi, Institute of Medicine and Delhi Medical Research, 1983), 11

[3] Al Itaqi, **The Treatise on Anatomy of Human Body and Innterpretation of Philosophers** (Islamabad, National Hijra Council, 1990), 20

result of a brutal beating ordered by a caliph angered by his candor). Despite the large fees and honors he received, his generosity to the less fortunate left him poor at the time of his death. Of his 237 books on many subjects including alchemy, anatomy, physiology, and ethics much has been lost. A large *part* of his work was a compilation of the theories of Hippocrates, Galen, and others. Through the clarity of his writing and his influence over students and contemporary physicians he brought much of Greek medicine to the Arabic world. His most celebrated work, Al-Hawi (Liber *Continents*), *summarized* the medical and surgical knowledge of his time.

Rhazes's fame rested on clear-cut clinical descriptions of illness, original observations, and a pragmatic approach to treatment However, he followed Galen's humoral pathology, practiced bloodletting, saw a place for precious stones in medication, and believed that the wrinkles of a pregnant woman could foretell the number of her children. On the other hand, he gave the first accurate desdcriptions of smallpox and measles, advised proper food in preference to drugs in treatment, opposed employment of the

abstruse mathematical formulas of al-Kindhi in therapy, and recommended simple rather than complex remedies.[4]

One of the important physicians in Islam was Avicenna (980-1037), the king of medicine. He had a great influence in the West and the East and was regarded as a medical authority until the era of modern medical studies.

Avicenna wrote nearly 200 works on several subjects; but he was famous as a physician and his most famous work is Qanun. It was used as a textbook in the West and the East. It was translated into Latin by Gerard of Cremona. The Qanun consists of 5 books and the first book is on anatomy. Here, Avicenna describes all the parts of the body in detail, beginning from the simple organs and proceeding to complex ones; at the end, he gives the description of the embryo. His main sources were Aristotle's and Galen's works, but he studied the human anatomy independently, and was a fairly good observer. Sometimes, he did not accept the ideas of the authorities mentioned above, and presented his critique and observations, as in his description of the embryo. He did not accept the earlier view about the first organ formed in the embryo. He thought

[4] Baloch, N.A **Great Books of Islamic Civilization** (Islamabd, Pakistan Hijra Council, 1989) :186

that the first organ formed in the embryo must be the umbilicus as it supplied nourishment for the embryo, then the heart; the liver and the brain.

> Avicenna noted the importance of anatomical knowledge and warned physicians not to perform surgical of the organs. Some historians of medicine have therefore, claimed that Avicenna must have dissected the human body, otherwise he could not have given this opinion or made those criticisms.[5]

Another physicians was Ibn al-Nafis. He was interested in the heart and the vessels; he discovered the lesser circulation of blood and gave his discovery in his work 'The Commentary on the Anatomy of Qanun'. Here, he says that there is no visible or invisible hole in the septum which lets blood pass from the right ventricle to the left. Although Otooman physicians knew him well, they could not understand his discovery and and they kept the Galenic description of the lesser circulation. One of the best example example among them is our writer, Itaqi. As is seen in his text, although he said that his description of the heart

[5] Abdullah, Dr Syed Urdu Encyclopedia of Islam (Lahore: Department of Urdu Encyclopedia of Islam, 2006),351

was different from the other, he did not realize that he was describing Ibn al-Nafis's discovery, the lesser circulation. Monograph on anatomy called "Illustrated Anatomy", which had some schemati9c drawings in it. Historians of medicine have claimed some schematic drawings in it. Historians of medicine have claimed that it was mainly a summary of the Thesaurus of Sayyid Ismail b. Jurijani who was a man of medicine in the eleventh century. This work is important for the study of our text, the "Anatomy of Human Body" by Itaqi who copied some schema from Ahmed b. Mansur's "Illustrated Anatomy" in his work, though he also presented different figures. In addition, the "Anatomy of Human Body" is longer than the "Illustrated Anatomy". Therefore, we can conclude that Itaqi had seen that work and used it. In fact, in the introduction to his book, he says that he used all the earlier anatomical works.[6]

METHODOLOGY AND TREATMENT

Arab practitioners used essentially the same methods as the Greeks and Romans. Diagnosis was based on six *criteria*: the patient's behavior; the excreta; the other effluvia from the body;

[6] Said, Hakeem Muhammad, Ibn Al-Haitham (Hamdard National Foundation, Karachi, Pakistan, 1969), 28

swellings; the character of pain; and the location of pain. The properties of the pulse were also carefully noted. Even astrology had a role, for the influence of the stars over health and disease was considered a part of natural the influence of the stars over health and disease was considered a part of natural science. Because of the emphasis placed on examining urine (uroscopy), the half-filled urine flask became a symbol of the physician. The urine's color, consistency, sediment, smell, and taste helped to determine what was wrong with a patient, to predict his prognosis, and to guide treatment.

Since surgery was held in low regard, much of the cutting, cauterizing, bandaging, bleeding, and cupping was done by untrained folk doctors, laymen, and charlatans. *Nevertheless*, some outstanding physicians practiced surgery and wrote about it. Lithorotomy (removal of stones from the urinary bladder) continued to be condemned as it had in Greco-Roman times, probably because of bad results.

The most common surgical technique of the Arabic physician was cauterization, which he used for both internal and external diseases. Anesthesia by means of a sponge saturated in a narcotic acid (or other soporific drug) held to the nose and mouth was widespread enough to have been imparted to Theodoric (454-526) in the Latin West. Galen's writings were interpreted to advocate formation of pus in wounds in order to

induce healing, and salves were therefore commonly applied. This unfortunate doctrine of "laudable pus" influenced surgical thinking throughout all areas of Christendom as well as Islam.

The special characteristic of Arab therapy was the wide employment of drugs of all kinds. The herbal De Materia Medica of Dioscorides (Ist century A.D.) was studied closely. Ne medications, including mineral as well as vegetable and animal substances, were added to make up a voluminous Arab materia medica. Ambergris, camphor, cloves, myrrh, and senna were introduced, and also preparations of syrups, juleps, elixirs, and many other concoctions of the apothecary. Some of these substances may have originated in China or India.[7]

Sugery:

Islamic surgeons were known for performing and documenting previously unseen surgical procedures. They also documented the intricate tools they invented and used. Abu al-Qasim Khalaf ibn al-'Abbas al-Zahrawi, known as the "father of surgery", wrote Kitab al-Tasrif, and illustrated and detailed guide that taught generations of subsequent surgical students. He improved on methods of surgeries that decreased mortality

[7] Said, Hakim Mohammed, Al Biruni's Book On Pharmacy and Materia Medica, (Karachi: Hamdard National Foundation ,1973), 5

Vol.8, No. 2|| January -June 2022 || P. 46-65
https://doi.org/10.29370/siarj/issue15ar3

rates, such as kidney stone removal. The invention of surgical tools that are still used today such as syringes, forceps, bone saws and plaster first physician known to mark incisions on patients' skin, which is tandard procedure to this day. He also pioneered cauterization and suturing methods.

Pharmacies / Drugs:

The fields of pharmacology and the existence of pharmacy called saydalas, was established during the Islamic Golden age. Although treatment using compounds drive from natural materials was observed throughout the world, Islamic scientists applied the science of chemistry to medicine. Important figures such as Abu-Bakr Muhammad ibn Zakariya Al-Razi developed chemical apparatuses still used in pharmaceutical laboratories today such as, mortars and pestles, flasks, and vials. He also carefully recorded drug preparation processes such as distillation, evaporation and crystallisation. Islamic pharmacology emphasized modern organic chemistry practices such as purity and empiricism. [8]

Abu Ali al-Hassan ibnul Hasan ibn al-Haitham known as Alhazen (965-1039) was a Muslim physicist, astronomer,

[8] Lyons, Albert S, Medicine, (New York, Harry N abrams Inc., Publishers, 1978), 310

The Scholar Islamic Academic Research Journal
Vol.8, No. 2|| January -June 2022 || P. 46-65
https://doi.org/10.29370/siarj/issue15ar3

mathematician and physician. His greatest work—The Kittabul Manazir—on optics contained the first correct exposition of the theory of vision. Through his explanations on natural phenomena such as light, colours, refrection of light rays, optic illusions and reflection, twilight, rainbow, halo mirrors, gravitational force velocity, halo mirrors, gravitational force velocity, space, atmosphere and density. He laid the cornerstone of science on which later scientists have raised the edifice.[9]

> Abu Raihan Muhammad bin Ahmed Al-Biruni (973-1048 AD) was the most excellent physician. He wrote "Kitab al-Saydanah fi Tibb" is a book on Pharmacy and Materia medica. In this book the eminent scientist has given detailed information on all major *drugs.*[10]

When we view the anatomical studies in the Ottoman *Empire,* we find the first anatomical descriptions in the works of two physicians f\who lived in the fourteenth century, i.e the works of Hadji Pascha and Djemal ad-Din of Aksaray. One of the main works of Hadji Pascha, the "Healing", gives us

[9] Said, Hakeem Muhammad, Ibn Al-Haitham (Hamdard National Foundation, Karachi, Pakistan, 1969), 220

[10] Said, Hakim Mohammed, Al Biruni's Book On Pharmacy and Materia Medica (Karachi: Hamdard National Foundation ,1973), 7

Vol.8, No. 2|| January -June 2022 || P. 46-65
https://doi.org/10.29370/siarj/issue15ar3

classical anatomical knowledge of the human body borrowed from former Islamic medical authorities, like Avicenna.

Djemal Ad-Din of Aksaray wrote his "Epitome" on the book of Ibn Al-Nafis – the "Commentary on The Anatomy of Avicenna". As has *been* mentioned above, Ibn al-Nafis work was very important but when Djemal ad_Din gave his anatomical descriptions, he missed some points *from it*.

In the fifteenth century, Ottoman physicians preferred to write their books in Turkish. As a result, excellent Turkish medical vocabulary developed. One of the important physicians who lived in this century was Shref ad=Din Sabuncuoglu. He was, in fact, a surgeon and wrote a book on surgery which has remarkable figures of the surgical operations and tools it also contains some anatomical descriptions of the organs although he mainly depended on the Islamic medical authorities, he *sometimes* gave his own ideas.

Another important ottoman physician in this century was Muhiddin of Sinop. He also wrote his works in Turkish like Sabuncuoglu. He had specialized in ophthalmology. In one of his works, the "Book of light" he described systematically the anatomy of the eyes, their functions and diseases and treatment. He also gave some figures of the eye and the tools which were used during the operations. *Here,* he described the coats of the eye in detail.

The Scholar Islamic Academic Research Journal
Vol.8, No. 2|| January -June 2022 || P. 46-65
https://doi.org/10.29370/siarj/issue15ar3

In the sixteenth century, Dervish Nidai of ankra wrote a book in Turkish which was called the "Useful Things for Man". This work is a typical medical *work,* i.e it gives description of the anatomical structure of the body, its diseases and treatments. He mainly depended on the earlier medical authorities although *sometimes* gave his own studies.

Davud of Antakya was another famous physician who lived in the sixteenth *century,* but wrote in Arabic. His works are a kind of medical encyclopedia which contain all medical subjects, including anatomy. It is interesting that he compared human structure which animals, like birds. He studied the nerves and *described* their distribution in detail.

In the seventeenth *century,* Ottoman physicians began to feel that their knowledge was *inadequate,* and they had to improve themselves. One of them was Emir Chelebi who wrote "Epitome of the Medicine". In the introduction to his *book,* he warned the physicians not to accept the knowledge that they were taught, without thinking and checking it. According to *him,* a physician had to study his subject and accept only what he found by means of his own studies.

In this century, European influence was observable for the first time. The earliest example was that of our other Shemseddin Itaqi of Shirwan who wrote the "Anatomy of human body and interpretations of Philosopher". In his

Vol.8, No. 2|| January -June 2022 || P. 46-65
https://doi.org/10.29370/siarj/issue15ar3

introduction Itaqi explained the reason why he wrote this book and how he wrote it. From his explanation, we learn that he studied medicine, *astronomy*, and Islamic *sciences;* he was well-educated and always a handworker, but *he could* not find employment. *However*, he was helped by Ali Efendi and Ibrahim Efendi.

Itaqi was in Shirwan which was conquered by the Ottomans in 1604. *Sometime* thereafter he left *Shirwan,* and travelled from one place to another. He complains of the ill treatment meted out to him and also of the indifference to science in those places. Itiqi was a bit of luckier in his old age. When he was in his sixties he was appointed as Judge of Makka and Medina by Sultan Murad IV. For this reason, gratitude to them.

Itaqi does not give any date in his book. He only says that he wrote it for Sultan Murad IV. We know that the reign of Sultan Murad IV was in between 1623 and 1632. In his *work,* Itiqi also says that the chief vizier was Recep Pasha. We also know that Recep Pasha was appointed in *1632 and* was in office only for three months. *Hence,* Itaqi must have written his book

The Scholar Islamic Academic Research Journal
Vol.8, No. 2|| January -June 2022 || P. 46-65
https://doi.org/10.29370/siarj/issue15ar3

in 1632. [11]

To sum up ,we can say that after the fall of the Roman *Empire, the* supremacy of the East was not only military but science, philosophy, poetry and the arts also flouristed in Islamic world at a time when Europe was sunk in barbarism. Europeans with unpardonable insularity, call this period "The Dark Ages";but it was only in Europe that it was dark-indeed only in Christian Europe, for Spain, where Muslims ruled at that time had a brilliant culture.[12]

As far as zoology was concerned, the Arabian people were familiar with the life and habits of all the domesticated animals which even now provide the basis of living for nomadic tribes. In pre-islamic times much specialized knowledge was amassed about the camel and the horse, while in Islam animals assumed religious significance since they shared man's destiny and were thought to provide lessons about God's wisdom and men's duties on Earth; indeed, religious laws laid down certain responsibilities over the way animals were treated. Thus in Islamic literary works there are frequent references to animals,

[11] Said, Hakim Mohammed, Al Biruni's Book On Pharmacy and Materia Medica (Karachi: Hamdard National Foundation ,1973), 7
[12] Russel, Bertrand ,New Hopes for a Changing World , (London, Colliers publishers, 1998) ,36.

The Scholar Islamic Academic Research Journal
Vol.8, No. 2|| January -June 2022 || P. 46-65
https://doi.org/10.29370/siarj/issue15ar3

which are used as symbols of cosmic qualities, but such references often display an intimate knowledge of animal *behavior.*[13]

In eighth-century zoological writing was mainly concerned with camels and horses by the ninth the mu'tazilite theologians (whose name implies they 'stood apart' in the quarrels over leadership in the Muslim community and who had a great sense of the rationality of the Islamic religion), and the scientist and mystic Ibn al-A'rabi, were concerned with underlining the way the animal world gives evidence of God's wisdom. Abu al-Jahiz, *known* for his masterful Arabic prose, was a Mu'tazilite and he, al-A'rabi and others classified some 350 animals into four categories, these categories being based on how the animals *moved.*[14]

During the ninth and first half of the tenth centuries we also find some decripitions of animals written by al-Kindi by al-Farabi, but the most important zoological contributions came from those who were compling general encyclopeadias andfrom others whose interest centered on natural history rather than on

[13] Chughtai,Ikram Muhammad , Famous Muslim Scientists (Lahore, Urdu Science Board, 1983), 15.
[14] Raymond**,** Notes on Science Voyages ,(Lisbon Oriental Publications 1949), 326.

The Scholar Islamic Academic Research Journal
Vol.8, No. 2|| January -June 2022 || P. 46-65
https://doi.org/10.29370/siarj/issue15ar3

philosophy; these were objective descriptions and included some of the exotic animals of india. But after the Middle of the tenth century the more philosophical works took over. These discussed the 'chain of being' rather along the liens of Aristotle's ladder of nature, and described the habitat, methods of reproducatio and the number of senses animals possessed. They provided anatomical descriptions of the internal or-gans, but all done from the point of view of divine design. Ibn Sina in the eleventh century and Ibn Rushed in the twelfth also wrote in this vein, though Ibn Sina went as far give some consideration to animal psychology. Encyclopaedic works with large sections on zoology continued to appear *in* the thirteenth and fourteenth centuries, and during the thirteenth al-Qazwini brought in a new animal classification based on an animal's means of defence. Later *on,* in the fourteenth century Kamal al-Din al-Farisi wrote The Great Book on the life of animals. This proved to be the foremost late Muslim work on zoology; in it al-Farisi systematized all translated all previous studies and so produced of great popularity and was translated into Turkish and pre-Sain, because of the religious as well as the factual material it contained. This interest animals continued throughout Mughal times, and the Mughal emperor of India, Jahangir, himself devoted *sections* of his own Book of Jahangir to careful descriptions of plants and animals, with pictures painted by

The Scholar Islamic Academic Research Journal
Vol.8, No. 2|| January -June 2022 || P. 46-65
https://doi.org/10.29370/siarj/issue15ar3

miniaturists at his court, especially the seventeenth-century master Mansur.[15]

In the medical field Arab culture owed much to the work of Galen (second century AD) Whose practical Knowledge as an anatomist was as surgeon to gladiators and soldiers but whose general medical outlook was based on earlier research carried out by Herophilos, Erasistratos and the teachings of the Aristotle. Galen's works were among the first Greek texts to be Translated and commented upon, especially by Thabit Ibn Qurra in Baghdad, while other medical men, notable Qusta Ibn Luqa and Ishaq Ibn Hunyan also made translations from syriac and Greek, again mainly of Galen. But ninth- and tenth-century Islamic medicine was not just a revival of Galenic medicine; straddling the two centuries like a medical colossus was the was the figure of Abu Bakr al-Razi.[16](16)

Conclusion:

Muslims have played very remarkable role in the field of medical sciences. They developed the techniques of distillation, crystallization and the use of alcohol as antiseptic. Muslim

[15] Bhatti, Nizam, Nomver Muslman Sciensdan (Sindhi) , (Hyderabad, Sindh Science Foundation), 27.

[16] Masood , Khalid, Ma'aroof Muslim Sciensdan, (Lahore , Urdu Science Board 1983), XXVII

The Scholar Islamic Academic Research Journal
Vol.8, No. 2|| January -June 2022 || P. 46-65
https://doi.org/10.29370/siarj/issue15ar3

physicians and scholars also laid the basis for medical practice in Europe. Before the Islamic era, medical care was largely provided by priests in sanatorium and annexes to temples. Ibn Al Nafees described the pulmonary circulation more than 300 years before William Harvey. Surgeon Abul Qasim Zahrawi' books became the leading medical texts in Europe. He was a leading pathologist.

In short Muslims are pioneer s and founders of Medical Sciences at the time when Europe was sunk in barbarism and European historians called that period the " Dark Ages". Al Razi, Ibn Al Haitham, Ibn Baitar and other physicians played very important role in the field of medical sciences.